JAPANESE PATENT OFFICE (JP)
PATENT KOKAI (A) NO. SHO 60[1985]-9663

Int. Cl.[4] Sequence Nos. for Office use
B 24 D 11/00 6551-3C
13/12 6551-3C

Application No. : Sho 58[1983]-116731

Application Date : June 27, 1983

Publication Date : January 18, 1985

No. of Inventions : 1(Total of 4 pages in original Japanese)

Examination Request: Not requested

TITLE: NONWOVEN CLOTH ABRASIVE MATERIAL
(Fusenfu kenmazai)

Inventor(s) and address(es) : Hisayuki Takigawa
206-1, Onishi, Shishido aza,
Amagasaki-shi

Applicant(s) and address(es): Hiroyuki Kanai
21-6, Higashiyama-cho,
Ashiya-shi

Amendments: There are no amendments to this patent.

TITLE OF THE PRESENT INVENTION: Nonwoven cloth abrasive material

CLAIMS

A nonwoven cloth abrasive material is characterized by the fact that is prepared by pressing a synthetic fiber nonwoven cloth that is temporarily secured with a binder having the major body of thermoplastic resin by use of hot emboss rolls to form a nonwoven cloth mat having concave, convex ( ) pattern of which pressed parts formed show so-called resin converted melt adhered concave ( ) parts while the parts which are not pressed show convex ( ) parts; and at the convex ( ) parts of above-explained nonwoven cloth mat, abrasive grains or polishing particles are contained and anchored by use of resin binder.

2. The nonwoven cloth abrasive material according to the claim 1, wherein it is characterized by the fact that the area of abrasive grains containing convex ( ) parts are formed as 5 to 20 %.

DETAILED EXPLANATION OF THE PRESENT INVENTION

The present invention, pertains to a nonwoven cloth abrasive product containing abrasive grains locally.

According to convention abrasive products of this type, the ones which are prepared by either impregnating or scattering synthetic resin containing abrasive grains in a nonwoven mat are known; and low density abrasive products of this type are effective as metal or wood finish as well as buff polishing application; however, they are not possible of shaving at high speed for the fields which require heavy shaving. Above all, as it is not possible to provide an evenly shaped plane on the shaved surface, their application is currently restricted.

That is to say, the surface that is finished with a low density abrasive product not only show uneven shaving depth but also, it shows undulation occurrence that cannot provide a glossy finish. Although abrasive cloth belt or cloth buss assembly are used for these fields at current moment, the abrasive cloth belt shows sudden decline in shaving force despite of its high initial shaving force to indicate no aptitude to a shaved goods, and cannot be used for a shape having concave, convex ( ) forms.

Furthermore, the cloth buss assembly is prepared by forming a resin layer containing hard abrasive grains close to those of grinding stones on a soft base substrate; and shows a defect that its abrasive grains are not contained over entire surface of a wheel requiring exchange of entire wheel when even one portion wears out.

The present invention solves above-explained defects; and it offers a nonwoven cloth abrasive material that utilizes difference in melt point of synthetic fibers and properties of temporary securing thermoplastic resin and is prepared by forming a nonwoven mat having concave, convex ( ) pattern over entire surface by pressing in set pattern or random manner by using a hot emboss roll and bulky convex ( ) parts which are not pressed, and by containing abrasive grains on fiber layer of convex ( ) parts only by impregnating resin binder containing abrasive grains.

Then, the configuration of the present invention's nonwoven cloth abrasive material is explained below in reference to attached Figures.

The Figure 1 shows schematic sectional view of the major parts of nonwoven cloth abrasive material what is one example of the present invention; and it uses synthetic fiber nonwoven cloth that is temporarily secured by scattering and adhering thermoplastic resin binder over fiber web prepared by using single material of such synthetic fibers including polyamide, polyester, polypropylene, polyvinylidene chloride, or nylon 66-nylon 6 composite fiber, polyester composite fiber, polypropylene-polyethylene composite fiber, or polyester-vinyl ethylene acetate composite fiber or by appropriately mixing them to be pressed with a hot emboss roll having set concave, convex ( ) [pattern to give 5 to 20 % area of concave ( ) parts (1) which are converted to resin and melt adhered by said pressing and 95 to 80 % area of convex ( ) parts (2) which are not pressed to form a concave, convex ( ) patterned nonwoven cloth mat (3) having so-called resin converted melt adhered concave ( ) parts. According to above-explained nonwoven cloth mat, a nonwoven cloth abrasive material (5) on which abrasive grains or polishing particles contained parts are present either in regular manner or irregular spot like manner is constructed by impregnation, drying, and heat treatment of resin binders (for instance, phenol resin, epoxy resin, polyurethane resin, NBR, SBR either alone or as appropriate mixtures) containing abrasive grains such as arandum, Carborundum, emery, diamond sand and other commercially available abrasive grains, and in some cases polishing particles such as aluminium powder or glass bead and resin powder to uniformly contain and anchor abrasive grains or polishing particles (4) only inside of fiber constructing above-explained bulky convex ( ) parts (2), and a small amount of abrasive grains are anchored only on the surface of concave ( ) parts (1) which are pressed and converted to resins.

Furthermore, the area of concave ( ) parts which are formed on above-explained nonwoven cloth mat is suitable when it is 5 to 20 %; and when it happens to be less than 5 %, no significant difference from that of ordinary nonwoven cloth abrasive product that is prepared by impregnating on a nonwoven cloth mat is displayed; and when it happens to exceed 20 %, as convex ( ) parts containing abrasive grains become less causing quick wear to result in problems: and therefore, 10 to 15 % is more preferable to show such benefits as it provides appropriate edge shaving against shaved goods surface in addition to appropriate presence of resin converted concave ( ) parts to cause less wear. In addition, as shown in the Figure 2 or noted in a simple laminate goods , it is possible to possible to first impregnate abrasive grains containing resin binder in a concave, convex ( ) patterned nonwoven mat (3) and then to form a spiral coiled goods; and when such laminate form is prepared, as perfect voids (g) are formed between laminate mats, heat diffusion becomes fast when is formed as a wheel to cause less thermal load to the wheel and difficult in causing clogging as well as it shows excellent cushioning effect due to voids to provide an outstanding nonwoven cloth abrasive product.

The present invention is further explained in detail below in reference to examples.

EXAMPLE 1

Composite fibers 15 de x 38 mm having 66 nylon as core part and 6 nylon as sheath part was spun with a Landwever [transliteration] machine to form a web with 100 g/m^2 weight. Then, binder solution explained below was scattered on each front and back surface of the web at 30 g/m^2, and this was dried to give a temporary secured nonwoven cloth.

scattered binder compound	
SBR latex	100 parts
melamine resin	35 parts
catalyst	8.5 parts

Then, this temporary secured nonwoven cloth was passed through one pair of hot emboss rolls (342°C) of which top roll is emboss roll and bottom roll is made of silicon rubber to form a nonwoven cloth mat having a continuous concave, convex ( ) pattern of which area of thermally fused and adhered concave ( ) parts which were converted to resin by being pressed with convex ( ) parts of the emboss roll is about 10 %.

The thickness of convex ( ) parts of above-explained nonwoven cloth mat was 5 mm, and concave ( ) part thickness was 1 mm. Then, this nonwoven cloth mat was subjected to an impregnation process by a binder explained below to adjust the weight of the product to 800 g/m^2.

impregnation binder compound

urethane prepolymer	100 parts
NEK	
pigment	small amount
aluminium oxide	800 g/m^2

As for the nonwoven cloth abrasive agent attained by drying and heating, it was formed as a nonwoven cloth abrasive material with 800 g/m^2, 5 mm convex ( ) thickness, 1 mm concave ( ) part thickness having abrasive grains containing parts locally through a concave, convex ( ) pattern of which inside and surface of convex ( ) parts constructing fiber layer, abrasive grains are uniformly contained and secured.

EXAMPLE 2

After immersion processing a nonwoven cloth mat having a concave, convex ( ) pattern formed in the same manner as explained in the example 1 in abrasive grains containing urethane prepolymer, it was coiled in a spiral form while it was wet to give prescribed outer diameter, and was left undisturbed for 24 hours in heat treatment chamber held at 100°C temperature and 40°C dew point to finish to final outer diameter, and this was cut in rings with prescribed width to give a spiral form nonwoven cloth abrasive material wheels.

Shaving test was carried out to compare the performance of spiral form nonwoven cloth abrasive wheel attained by above-explained examples and conventional spiral form abrasive wheel.

Shaving conditions included wheel outer diameter 305 mm, width 50 mm, load 1 kg/cm, rotation speed 3000 rpm, and stainless sheet was used as a shaved goods , and this was traversed [transliteration] at 10 m/min. Shaving time was set as 10 minutes.

Results of shaving are shown in the Table below.

	shaving rate	consumption	shaving ratio
the present invention	8.00	2.00	4.0
conventional product	4.00	2.00	2.0

As it may be clear from above-explained Table, the present invention shows better shaving effect and the shaved goods surface after 1 continuous hour of shaving remained flat in the case of the present invention; and to this, conventional goods showed undulation. This is simply estimated due to the difference in plane polishing and edge polishing by convex ( ) parts containing abrasive grains.

As the present invention is structured in the manner explained above, the abrasive grains containing convex (凸) parts work in sharp angle to provide a finish plane showing uniform shaving depth without any undulations; and in addition, when it is formed in spiral form or laminate goods, even when the first layer may become worn, the convex (凸) parts of the second layer appear to provide always stable shaving performance. In addition, when above-explained spiral or laminate goods is formed as a wheel, as perfect void part is formed between layers, good heat diffusion may be attained to cause less thermal load to the wheel to prolong the life. Furthermore, clogging is difficult to occur and provides excellent cushioning effect to display good effects.

BRIEF EXPLANATION OF THE FIGURES

The Figure 1 shows a schematic sectional view of the major parts of one example of the present invention; and the Figure 2 shows front view of other example.

(1)... concave (凹) part, (2) .... convex (凸) part, (3) ... nonwoven mat, (4) ... abrasive grains or polishing particles, (5) ... nonwoven cloth abrasive material, (6) ... void

図 1

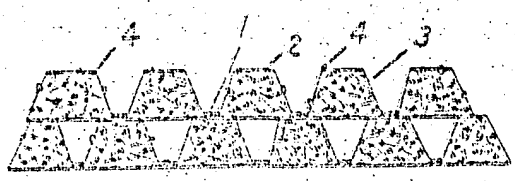

図 2